AMENDMENTS TO THE CLAIMS

IN THE CLAIMS:

A complete set of claims is provided below.

1. (Currently Amended) A method of **calculating a distribution of electric charge or an electric current due to an electric field** ~~**data compression**~~, comprising:

using software loaded into a computer memory attached to a computer processor **and storing compressed data in said computer memory**, partitioning a first set of basis functions into groups, each group corresponding to a region, each basis function corresponding to one unknown in a system of linear equations, each of said basis functions corresponding to an original source**, wherein said system of linear equations models said distribution of electric charge or electric current due to said electric field**;

selecting a plurality of spherical angles;

calculating a far-field disturbance produced by each of said basis functions in a first group for each of said spherical angles to produce a matrix of transmitted disturbances wherein a plurality of said basis functions in said first group **of basis functions** describes electric fields produced by electric charge;

on said computer processor, using a first rank reduction to reduce a rank of said matrix of transmitted disturbances to yield a second set of basis functions, said second set of basis functions corresponding to composite sources, each of said composite sources comprising a linear combination of a plurality of **basis functions of** said ~~**original**~~ **first set of** basis functions;

partitioning a first set of weighting functions into groups, each group corresponding to a region, each weighting function corresponding to a condition, each of said weighting functions corresponding to an original tester;

calculating a far-field disturbance received by each of said testers in a first group **of testers** for each of said spherical angles to produce a matrix of received disturbances;

on said computer processor, using a second rank reduction to reduce a rank of said matrix of received disturbances to yield a second set of weighting functions, said second

set of weighting functions corresponding to composite testers, each of said composite testers comprising a linear combination of a plurality of said original testers; ~~**and**~~

transforming said system of linear equations to use said composite sources and said composite testers to produce a second system of equations wherein at least a portion of said second system of equations is compressed relative to said system of linear equations and wherein for at least a first portion of said second system of equations~~**, said first portion**~~ using said composite sources and said composite testers, at least a portion of said matrix of transmitted disturbances is different from said matrix of received disturbances and ~~**using said second system of equations**~~ wherein said compression enables relatively more efficient use of said second system of equations; and

using said second system of equations ~~**computing a resulting electric field due, at least in part, to said plurality of said basis functions in said first group**~~ <u>**calculating and storing said distribution of electric charge or electric current due to said electric field**</u>.

2. (Currently Amended) A method of data compression, comprising:

using a computer program in a computer-readable medium <u>**attached to a computer processor**</u>, partitioning a first set of basis functions into groups, each group corresponding to a region, each basis function corresponding to an unknown in a system of equations, each of said basis functions corresponding to an original ~~**physical**~~ source<u>**,**</u> <u>**wherein said system of equations models at least one of an electric field, a magnetic field, a pressure, and a particle flux that is produced by at least one of a distribution of electric charge, an electric current, an exciting pressure, and an exciting particle flux**</u>;

selecting a first plurality of angular directions;

using ~~**a**~~ <u>**said**</u> computer <u>**processor**</u> ~~**system**~~, calculating a disturbance produced by each of said basis functions in a first group for each of said angular directions to produce a matrix of disturbances;

using said matrix of disturbances to compute a second set of basis functions, said second set of basis functions corresponding to composite sources, wherein at least one of

said composite sources is configured to produce a relatively weak disturbance ~~**from**~~ **<u>to</u>** a portion of space ~~**around**~~ **<u>relative to</u>** said at least one composite source;

partitioning a first set of weighting functions into groups, each group corresponding one of said regions, each weighting function corresponding to a condition, each of said weighting functions corresponding to an original tester;

using ~~**a**~~ **<u>said</u>** computer **<u>processor</u>** ~~system~~, calculating a disturbance received by each of said testers in a second plurality of angular directions to produce a matrix of received disturbances;

using said matrix of received disturbances to compute a second set of weighting functions, said second set of weighting functions corresponding to composite testers, wherein at least one of said composite testers is configured to weakly receive disturbances from a portion of space relative to said at least one composite tester;

transforming at least a first portion of said system of equations into a transformed system of equations to use one or more of said composite sources and one or more of said composite testers wherein at least a second portion of said transformed system of equations is compressed relative to said system of equations;

<u>storing said second portion in a computer readable medium attached to said processor;</u>

wherein for an element of said second portion **<u>of said transformed system of equations</u>** said matrix of disturbances is, at least in part, different from said matrix of received disturbances; and

using said ~~**compressed**~~ second portion of said transformed system of equations to compute **<u>and store said</u>** at least one of ~~**an electromagnetic field, a heat flux,**~~ an electric field, a magnetic field, ~~**a vector potential,**~~ a pressure, ~~**a sound wave,**~~ **<u>and</u>** a particle flux~~,~~ ~~**a weak nuclear force, a strong nuclear force, and a gravity force due, at least in part, to said physical sources**~~ **<u>that is produced by said at least one of a distribution of electric charge, an electric current, an exciting pressure, and an exciting particle flux</u>**.

3. (Original) The method of Claim 2, wherein said matrix of disturbances is a moment method matrix.

4. (Original) The method of Claim 2, wherein said step of using said matrix of disturbances to compute a second set of basis functions comprises reducing a rank of said matrix of disturbances.

5. (Original) The method of Claim 2, wherein said step of using said matrix of received disturbances to compute a second set of weighting functions comprises reducing a rank of said matrix of received disturbances.

6. (Canceled)

7. (Previously Presented) The method of Claim 2, wherein said first plurality of angular directions is substantially the same as said second plurality of angular directions.

8. (Currently Amended) The method of Claim 2, wherein said ~~regions~~ **portion** of space ~~around~~ **relative to** said at least one composite source ~~are~~ **is a** far-field ~~regions~~ **region**.

9. (Currently Amended) The method of Claim 2, wherein said ~~at least a~~ portion of ~~a region around~~ **space relative to** said at least one composite tester is a far-field region.

10. (Currently Amended) A method of data compression, comprising:

using software loaded into a computer-readable memory attached to a computer processor, **storing at least a portion of a first system of equations in said computer-readable memory, said first system of equations modeling at least one of an electric field, a magnetic field, a pressure, and a particle flux produced by at least one of a distribution of electric charge, an electric current, an exciting pressure, and an exciting particle flux;**

calculating one or more composite sources as a linear combination of more than one basis functions, wherein at least one of said composite sources is configured to produce a relatively weak disturbance in a portion of space related to said at least one composite source;

using said computer processor, calculating one or more composite testers as a linear combination of more than one weighting functions, wherein at least one of said composite testers is configured to be relatively weakly affected by disturbances propagating from a portion of space ~~around~~ **related to** said at least one composite tester;

using said computer processor, transforming at least a portion of ~~a~~ **said** first system of equations based on said basis functions and said weighting functions into **a** second **system of** equations based on said composite sources and said composite testers, wherein for an element of said second **system of** equations one of said one or more composite sources and one of said one or more composite testers are computed using at least partially different data, and wherein said second **system of** equations ~~are~~ **is** compressed relative to said first system of equations; and

using said second **system of** equations to compute **and store said** at least one of ~~an electromagnetic field, a heat flux,~~ an electric field, a magnetic field, ~~a vector potential,~~ a pressure~~, a sound wave~~, **and** a particle flux~~, a weak nuclear force, a strong nuclear force, and a gravity force~~ resulting, at least in part, from said more than one basis functions **at least one of said a distribution of electric charge, an electric current, an exciting pressure, and an exciting particle flux**.

11. (Canceled)

12. (Previously Presented) The method of Claim 10, wherein said composite sources comprise electric currents.

13. (Canceled)

14. (Original) The method of Claim 10, wherein said composite sources comprise acoustic sources.

15. (Original) The method of Claim 10, wherein said composite sources comprise electromagnetic sources.

16. (Original) The method of Claim 10, wherein said composite sources comprise thermal sources.

17. (Original) The method of Claim 10, wherein each of said composite sources corresponds to a region.

18. (Original) The method of Claim 10, wherein said second system of equations is described by a sparse block diagonal matrix.

19. (Original) The method of Claim 18, further comprising the step of reordering said sparse block diagonal matrix to shift relatively larger entries in said matrix towards a desired corner of said matrix.

20.-33 (Canceled)

34. (Previously Presented) The method of Claim 1, wherein said transforming said system of linear equations produces a substantially sparse system of linear equations.

35.-39. (Canceled)

40. (Previously Presented) The method of Claim 1, wherein said matrix of received disturbances comprises a moment-method matrix.

41. (Previously Presented) The method of Claim 1, wherein said matrix of transmitted disturbances comprises a moment-method matrix.

42. (Previously Presented) The method of Claim 2, wherein said matrix of received disturbances comprises a moment-method matrix.

43. (Currently Amended) The method of Claim 2, wherein said transforming at least a **first** portion of said system of equations to use one or more of said composite sources and one or more of said composite testers comprises transforming substantially all of said system of equations to use one or more of said composite sources and one or more of said composite testers.

44. (Previously Presented) The method of Claim 43, wherein said transforming substantially all of said system of equations produces substantial sparseness.

45. (Canceled)

46. (Currently Amended) The method of Claim 2, wherein said relatively weak disturbance ~~**from**~~ **to** a portion of space ~~**around**~~ **relative to** said at least one composite source comprises a portion of space at distances relatively shorter than a distance to other physical regions.

47. (Previously Presented) The method of Claim 46, wherein said portion of space at distances relatively shorter than a distance to other physical regions comprises a relatively non-intertwining portion of space.

48. (Currently Amended) The method of Claim 2, wherein said relatively weak disturbance ~~**from**~~ **to** a portion of space ~~**around**~~ **relative to** said at least one composite source comprises a portion of space comprising substantially all angular directions in said first plurality of angular directions.

49. (Previously Presented) The method of Claim 48, wherein said portion of space comprising substantially all angular directions in said first plurality of angular directions comprises a relatively non-intertwining portion of space.

50. (Currently Amended) The method of Claim 10, wherein said transforming at least a portion of ~~a~~ **said** first system of equations comprises transforming substantially all of ~~a~~ **said** first system of equations based on said basis functions and said weighting functions into a second system of equations based on said composite sources and said composite testers.

51. (Previously Presented) The method of Claim 50, wherein said second system of equations is substantially sparse.

52. (Currently Amended) The method of Claim 10 wherein said at least a portion of ~~a~~ **said** first system of equations comprises an interaction between at least one of said basis functions is relatively close to and at least one of said weighting functions.

53. (Previously Presented) The method of Claim 52 wherein either said one or more composite sources is calculated using a matrix of transmitted disturbances or said one or more composite testers is calculated using a matrix of received disturbances.

54. (Previously Presented) The method of Claim 10 wherein either said one or more composite sources is calculated using a matrix of transmitted disturbances or said one or more composite testers is calculated using a matrix of received disturbances.

55. (Currently Amended) A method of data compression, comprising:

using a computer program in a computer-readable memory attached to a computer processor, partitioning a first set of basis functions into groups, each group corresponding to a region, each basis function corresponding to one unknown in a system of linear equations, ~~**each of said basis functions corresponding to a physical source**~~ **said**

<u>system of linear equations modeling at least one of an electric field, a magnetic field, a pressure, and a particle flux that is produced by at least one of a distribution of electric charge, an electric current, an exciting pressure, and an exciting particle flux</u>;

selecting a plurality of spherical angles;

calculating a far-field disturbance produced by each of said basis functions in a first group for each of said spherical angles to produce a matrix of transmitted disturbances;

~~**on**~~ **<u>using</u>** said computer processor reducing a rank of said matrix of transmitted disturbances to yield a second set of basis functions, said second set of basis functions corresponding to composite sources, each of said composite sources comprising a linear combination of a plurality of **<u>basis functions of</u>** said ~~**original**~~ **<u>first set of</u>** basis functions;

identifying weighting functions, each weighting function corresponding to a condition, each of said weighting functions corresponding to a tester; and

~~**on**~~ **<u>using</u>** said computer processor transforming said system of linear equations to use one or more of said composite sources and one or more of said testers to produce a second system of equations wherein at least a portion of said second system of equations is compressed relative to said system of linear equations and wherein at least a first portion of said second system of equations uses said composite sources and said ~~**original**~~ testers;

<u>storing at least a portion of said second system of equations on said computer readable memor;</u> and

using said transformed system of equations to compute ~~**a disturbance produced by said physical sources, said disturbance produced by said physical sources comprising at least one of an electromagnetic field, a heat flux, an electric field, a magnetic field, a pressure, a sound wave, a particle flux, a weak nuclear force, a strong nuclear force, and a gravity force**~~ **<u>and store said at least one of an electric field, a magnetic field, a pressure, and a particle flux that is produced by said at least one of a distribution of electric charge, an electric current, an exciting pressure, and an exciting particle flux</u>**.